## WHAT IS CLAIMED IS:

1	1. A method of reconstructing optical tissues of an eye, the method				
2	comprising:				
3	transmitting an image through the optical tissues of the eye;				
4	measuring surface gradients from the transmitted image across the optical				
5	tissues of the eye; and				
5	applying a Fourier transform algorithm to the surface gradients to reconstruct				
7	a surface that corresponds to the optical tissues of the eye.				
1	2. The method of claim 1 comprising aligning the reconstructed surface				
2	1 0 0 0				
3	of the optical tissues of the eye with an image of the eye that was obtained during the				
3	measuring of the surface gradients.				
1	3. The method of claim 1 or 2 comprising computing a correction				
2	ablation pattern based on the optical tissues of the eye as indicated by the Fourier				
3	reconstructed surface.				
1	4. The method of claim 3 wherein computing a correction ablation pattern				
2	comprises deriving a proposed change in elevations of the optical tissue so as to effect a				
3	desired change in optical properties of the eye.				
,	desired change in optical properties of the eye.				
1	5. The method of claim 4 further comprising modifying the optical tissue				
2	surface according to the correction ablation pattern by laser ablation.				
1	6. The method of claim 1 further comprising adding a mean gradient field				
2	to remove a tilt from the reconstructed surface.				
_	to remove a fire from the reconstructed surface.				
1	7. The method of claim 1 wherein measuring the surface gradients				
2	comprises uniformly sampling the transmitted image over an aperture.				
1	8. The method of claim 7 wherein the aperture is a pupil of the eye.				
•	of the method of claim? Wherein the aperture is a papir of the eye.				
l	9. The method of claim 1 wherein measuring surface gradient data is				
2	carried out with a Hartmann-Shack sensor assembly.				
	10. The method of claim 1 wherein the surface is a wavefront surface.				
-	10. The medica of claim 1 wholem are surface to a wavefull surface.				

1		11.	The method of claim 1 wherein applying a Fourier transformation		
2	comprises app	lying a	discrete Fourier decomposition and an inverse discrete Fourier		
3	transform.				
1		12.	The method of claim 1 wherein the Fourier transformation uses all of		
2	the available i		ation in the reconstruction.		
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1		13.	The method of claim 1 wherein applying the Fourier transform		
2	calculates a tomographic wavefront error map of the optical tissues of the eye.				
1		14.	The method of claim 1 wherein the image is transmitted by the optical		
2	tissues as a plu	urality	of beamlets, wherein the surface gradients comprise an array of		
3	gradients,				
4		where	in each gradient corresponds to an associated portion of the optical		
5	tissues of the	eye, wh	nerein each beamlet is transmitted through the optical tissues according		
6	to the corresponding gradient.				
1		15.	A method for measuring optical tissues of an eye, the method		
2	comprising:				
3		transmitting an image through the optical tissues;			
4		detern	nining local gradients across the optical tissues from the transmitted		
5	image; and				
6		mappi	ng a wavefront error of the eye by applying a Fourier transform		
7	algorithm to the surface gradients across the optical tissues of the eye.				
8		16.	The method of claim 15 further comprising adding a mean gradient		
9	field to the wa	vefron	t error to correct for tilt.		
1		17.	The method of claim 15 wherein determining local gradients across the		
2	optical tissues		ied out by a Hartmann-Shack sensor assembly.		
1		10			
1	4 1.1 - 1 1	18.	The method of claim 15 comprising creating a laser ablation treatment		
2	table based on	tne ma	apped wavefront error of the optical tissues of the eye.		
1		19.	The method of claim 18 comprising modifying the optical tissue		
2	surface according to the correction ablation pattern by laser ablation.				

1		20.	A system for measuring a wavefront error of optical tissue, the system		
2	comprising:				
3	a processor;				
4	a memory coupled to the processor, the memory configured to store a plurality				
5	of code modules for execution by the processor, the plurality of code modules comprising:				
6			a module for transmitting an image through the optical tissues;		
7			a module for determining local gradients across the optical tissues from		
8	the transmitted image; and				
9			a module for mapping a wavefront error of the eye by applying a		
10	Fourier transform algorithm to the surface gradients across the optical tissues of the eye.				
1		21.	The system of claim 20 further comprising an image source coupled to		
2	the processor f	or tran	smitting a source image through the optical tissues of the eye.		
1		22.	The system of claim 20 further comprising a wavefront sensor system		
2	coupled to the	proces	sor.		
1		23.	The system of claim 22 wherein the wavefront sensor system		
2	comprises a H	artman	n-Shack sensor assembly.		
1		24.	The system of claim 20 wherein the code modules further comprise a		
2	module for cor	nputin	g a correction ablation pattern based on the optical tissues of the eye as		
3	indicated by th	e Four	ier reconstructed surface.		
1		25.	A laser system that is in communication with the system of claim 24		
2	wherein the laser system comprises a laser that is programmable to deliver a laser energy to				
3	the optical tiss	ues acc	cording to the correction ablation pattern.		
1		26.	The system of claim 20 further comprising a camera to track the		
2	position of the	optica	l tissues,		
3	wherein the code modules further comprise a module for registering the				
4	wavefront erro	r relati	ve to the optical tissues.		
1		27.	The system of claim 20 further comprising an adaptive optical element		
2	that is coupled to the processor.				

deformable mirror.  29. A computer program stored on a computer-readable storage medium for measuring optical tissues, the computer program comprising:  code for transmitting an image through the optical tissues of the eye;  code for measuring surface gradients from the transmitted image across the optical tissues of the eye; and  code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues from the transmitted image; and  means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.	1	28. The system of claim 27 wherein the adaptive optical element is a				
code for transmitting an image through the optical tissues of the eye; code for measuring surface gradients from the transmitted image across the optical tissues of the eye; and code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising: means for transmitting an image through the optical tissues; means for determining local gradients across the optical tissues from the transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	2	deformable mirror.				
code for transmitting an image through the optical tissues of the eye; code for measuring surface gradients from the transmitted image across the optical tissues of the eye; and code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising: means for transmitting an image through the optical tissues; means for determining local gradients across the optical tissues from the transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	1	29 A computer program stored on a computer-readable storage medium				
code for transmitting an image through the optical tissues of the eye; code for measuring surface gradients from the transmitted image across the optical tissues of the eye; and code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  1 31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  1 32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising: means for transmitting an image through the optical tissues; means for determining local gradients across the optical tissues from the transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
code for measuring surface gradients from the transmitted image across the optical tissues of the eye; and code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues;  means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
optical tissues of the eye; and code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising: means for transmitting an image through the optical tissues from the transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
code for mapping a wavefront error of the eye by applying a Fourier transform algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues; means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
algorithm to the surface gradients across the optical tissues of the eye.  30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues;  means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
30. The computer program of claim 29 further comprising code for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  1 31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  1 32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  1 33. A system for measuring optical tissues of an eye, the method comprising:  3 means for transmitting an image through the optical tissues; means for determining local gradients across the optical tissues from the transmitted image; and  5 means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier		code for mapping a wavefront error of the eye by applying a Fourier transform				
computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier reconstructed surface.  1 31. The computer program of claim 30 further comprising code for delivering a laser energy to the optical tissues according to the correction ablation pattern.  1 32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  1 33. A system for measuring optical tissues of an eye, the method comprising:  3 means for transmitting an image through the optical tissues;  4 means for determining local gradients across the optical tissues from the transmitted image; and  5 means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	7	algorithm to the surface gradients across the optical tissues of the eye.				
the Fourier reconstructed surface.  1	8	30. The computer program of claim 29 further comprising code for				
1 31. The computer program of claim 30 further comprising code for 2 delivering a laser energy to the optical tissues according to the correction ablation pattern.  1 32. The computer program of claim 29 further comprising code for 2 aligning the mapped wavefront error with an image of the optical tissues of the eye.  1 33. A system for measuring optical tissues of an eye, the method 2 comprising: 3 means for transmitting an image through the optical tissues; 4 means for determining local gradients across the optical tissues from the 5 transmitted image; and 6 means for mapping a wavefront error of the eye by applying a Fourier 7 transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a 2 correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	9	computing a correction ablation pattern based on the optical tissues of the eye as indicated by				
delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues;  means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	10	the Fourier reconstructed surface.				
delivering a laser energy to the optical tissues according to the correction ablation pattern.  32. The computer program of claim 29 further comprising code for aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues;  means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
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aligning the mapped wavefront error with an image of the optical tissues of the eye.  33. A system for measuring optical tissues of an eye, the method comprising:  means for transmitting an image through the optical tissues;  means for determining local gradients across the optical tissues from the transmitted image; and  means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	2	delivering a laser energy to the optical tissues according to the correction ablation pattern.				
1 33. A system for measuring optical tissues of an eye, the method 2 comprising: 3 means for transmitting an image through the optical tissues; 4 means for determining local gradients across the optical tissues from the 5 transmitted image; and 6 means for mapping a wavefront error of the eye by applying a Fourier 7 transform to the surface gradients across the optical tissues of the eye. 1 34. The system of claim 33 further comprising means for computing a 2 correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	1	32. The computer program of claim 29 further comprising code for				
2 comprising: 3 means for transmitting an image through the optical tissues; 4 means for determining local gradients across the optical tissues from the 5 transmitted image; and 6 means for mapping a wavefront error of the eye by applying a Fourier 7 transform to the surface gradients across the optical tissues of the eye. 1 34. The system of claim 33 further comprising means for computing a 2 correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	2	aligning the mapped wavefront error with an image of the optical tissues of the eye.				
2 comprising: 3 means for transmitting an image through the optical tissues; 4 means for determining local gradients across the optical tissues from the 5 transmitted image; and 6 means for mapping a wavefront error of the eye by applying a Fourier 7 transform to the surface gradients across the optical tissues of the eye. 1 34. The system of claim 33 further comprising means for computing a 2 correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
means for transmitting an image through the optical tissues; means for determining local gradients across the optical tissues from the transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	1					
means for determining local gradients across the optical tissues from the transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	2	comprising:				
transmitted image; and means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	3	means for transmitting an image through the optical tissues;				
means for mapping a wavefront error of the eye by applying a Fourier transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	4	means for determining local gradients across the optical tissues from the				
transform to the surface gradients across the optical tissues of the eye.  1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	5	transmitted image; and				
1 34. The system of claim 33 further comprising means for computing a correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	6	means for mapping a wavefront error of the eye by applying a Fourier				
2 correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier	7	transform to the surface gradients across the optical tissues of the eye.				
2 correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier						
1	1	34. The system of claim 33 further comprising means for computing a				
	2	correction ablation pattern based on the optical tissues of the eye as indicated by the Fourier				
3 reconstructed surface.	3	reconstructed surface.				
1 35. The system of claim 34 further comprising means for modifying the	1	35. The system of claim 34 further comprising means for modifying the				
2 optical tissue surface according to the correction ablation pattern by laser ablation.		1 3 4 4 7 3 4				